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**OUTREACH FOR
ENERGY CONSERVATION
USING AERIAL
THERMOGRAPHY
TWO DEMONSTRATION PROJECTS**

NASA

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OUTREACH FOR ENERGY CONSERVATION USING AERIAL THERMOGRAPHY

TWO DEMONSTRATION PROJECTS

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PROLOGUE

(The following fictionalized capsule of a community meeting has been culled from interviews with staff and community participants in the Fairfax Environmental Improvement Project.)

About 15 members of a block club in Cleveland's Fairfax community gather in the early evening for their monthly meeting. The item on the agenda will be a presentation by staff members of the Fairfax Environmental Improvement Project (EIP) on the loss of heat from houses and what homeowners can do about it.

Interest has been generated by telephone calls during which EIP staff persons have told homeowners that they know about their high heating bills. Surprise at this knowledge has provoked the curiosity of the block club members, and they have come to the meeting to find out about the thermograph "pictures" of their homes, taken from an airplane by NASA Lewis. Concern over high gas bills has aroused them to take the first step in the outreach process—attending a meeting.

Before the meeting there is little talk about gas bills. Some are too embarrassed to speak of the problem. Others are reticent about discussing what they consider to be their personal business. These people are neighbors and friends, and the conversations cover many areas—from children and grandchildren to churches to neighborhood events. As the meeting begins, all quickly turn their attention to the EIP staff person who is the main speaker. He says, "As I told many of you before, I know your gas bills are high. In fact, some of you are paying as much as \$100 a month." A woman near the center of the room asks, "How would you know that?" The speaker explains the cooperative efforts of the gas company, the city, the space agency, and the Fairfax Foundation. He adds, "Let me assure you that the gas company has not given us information about individual gas bills; they gave us only averages. We ourselves have found out more just by talking to other groups in the area just like yours." A man comments that he has heard about this "energy conservation business, like turning down thermostats and such" but for him and his family that just means being cold and uncomfortable. The speaker explains that the methods EIP will suggest should enable him to be comfortable, save energy, and save money.

The speaker obviously has his audience's attention, and he launches into a discussion of the various ways older homes lose heat. He shows a slide-and-tape presentation, produced by NASA Lewis, which further describes heat loss, insulation, the NASA thermography program, and the steps a homeowner can take to make his or her home more energy efficient. At the end of the presentation samples of insulation are passed around the room. Some say they have never seen it before; some confess that they had never even heard of it.

By this time most block club members are very interested, but they want to know how much installing insulation will cost. Many people in the Fairfax community are retired and on fixed incomes. Some have difficulty even affording the necessities of life. Now another EIP staff member takes over the speaking duties. First she passes out packets of leaflets from the East Ohio Gas Company, the city of Cleveland, the Fairfax Foundation, the Council for Economic Opportunity of Greater Cleveland (CEO), and NASA Lewis. Then she explains an assistance program offered by CEO that provides insulation materials and the labor to install it free of charge to those persons who qualify. One man expresses disbelief that he or any of them could get something tangible from a government agency. Most of the others nod in agreement. The speaker has considerable difficulty convincing them that they could really benefit from the program. In the end a few sign up to have their homes insulated, but many are not convinced and will wait for some time until word of the program's success filters through the community.

After the formal talks are over, EIP staff members meet with each block club member to review a thermograph of his or her home and to discuss eligibility for the CEO insulation program. Many do not understand the scientific concept behind the thermography. Yet they are interested to see roof temperatures of their own homes as well as those of their neighbors and of important community buildings such as churches and schools. They can see that nearly every building in the neighborhood is losing heat and that they are not alone in having high gas bills. With the sure knowledge that they are not facing the problem alone, many people find it easier to take the necessary steps in the process of weatherizing their homes.



SUMMARY

Two areas of Cleveland, Ohio, were involved in separate demonstrations of outreach to the public in which aerial thermography was used to encourage the use of energy conservation. The effectiveness of the two separate approaches is discussed. The objectives of these demonstrations were to inform the public of unnecessary heat loss from residential dwellings and to encourage homeowners to take steps to improve the energy efficiency of their homes.

The Fairfax Demonstration Project

The Fairfax outreach project, in progress for over a year, is directed toward 3000 homeowners in the Fairfax area through a centrally located project office into a network of street clubs and neighborhood organizations. The project's primary aim is to encourage homeowners to conserve energy by winterizing their homes. The chief tools used are aerial thermographs, public meetings, and home visit energy-use evaluations. The program is administered by an inner-city community organization, the Fairfax Foundation (which operates under a Comprehensive Employment Training Act (CETA) grant), with the cooperation of the NASA Lewis Research Center,

the East Ohio Gas Co. (EOG), the City of Cleveland, and the Greater Cleveland Council for Economic Opportunities.

The Fairfax Foundation established and staffed a center from which the Environmental Improvement Project (EIP) outreach campaign was organized. NASA Lewis provided aerial thermographs, which had been taken during a March 24, 1977, overflight of several Federal Housing and Urban Development (HUD) target areas of Cleveland. NASA Lewis also procured the services of a local firm of graphics designers to assist in the planning of the project center, to provide audiovisual materials, and to report on the progress of the project since its start in May of 1978. Through the Fairfax EIP, direct and extended contact was made with 700 of the estimated 3000 area homeowners. These contacts occurred at community meetings in homes or at the EIP center and were followed by meetings with individuals in their own homes. Of the residents contacted, 167 took steps toward winterizing their homes. Since this group consists mostly of people over 65 who are retired and of limited means, it has been necessary for 162 homeowners to apply for CEO winterization grants. The grants are supported by funds provided by the U.S. Department of Energy under Project Retro-tech. With guidance, 89 homeowners have started low-cost winterization projects on their own, while awaiting the disposition of their applications. Work has

been completed on 22 homes, and it is expected that the rest will be winterized by the end of 1979.

It was the colorful aerial thermographs of the Fairfax area, showing the heat loss from each residence, that catalyzed the Fairfax outreach process. Of itself thermography cannot induce widespread acceptance of energy conservation measures, but it does provide a dramatic and personalized focus.

A second major aspect of the winterization project at the EIP center developed during the early stages of the program. During block club meetings, many people mentioned other environmental problems, not directly or solely related to energy conservation. These people did not know the proper governmental or social agency to call for help with these problems. The EIP center soon became a liaison between the community and these agencies. Since then, EIP staff members have referred more than 150 people to other agencies. This function has been so appreciated by the community that EIP has established publicized weekly meetings called the Community Exchange. The entire community is invited to these meetings to air complaints or to listen to speakers discuss issues of general community concern. The Community Exchange has also proved to be an effective vehicle for publicizing the home winterization program.

In summary, the Fairfax EIP project, through its ongoing outreach function and organized follow-up, has reached a significant fraction of the community population in its first eight months of operation. It is beginning to see benefits for large numbers of its eligible applicants through winterization grants from the CEO.

West Park Demonstration Project

In the second outreach effort, the West Park project, 4000 customers of the East Ohio Gas Company received by mail an offer of a free home energy-use evaluation by a gas company representative along with an opportunity to see color thermographs of their own homes. The objectives of the West Park project were the same as those of the Fairfax project: motivating homeowners to take recommended energy conservation actions. The West Park direct-mail project resulted in a response from 130 homeowners. This response represents 3.1 percent of the 4000 EOG customers, who received the mailers. The home

energy evaluations were promptly completed by representatives of the gas company.

To determine the effectiveness of the energy evaluation visits, these homeowners were interviewed by telephone a year later. The survey indicated that roughly one-third had already responded to energy conservation appeals by winterizing their homes before the EOG evaluation, one-third acknowledged that their homes were marginally winterized but were complacent and planned no near-term action, and one-third were becoming aware of high heat loss in their homes and were planning to insulate their attics in the near future.

The 3.1 percent response to the West Park mailer campaign may be a significant measure of the appeal of aerial thermography. The gas company had run large newspaper advertisements and had inserted coupons in a monthly gas billing offering the home energy-use evaluation to their nearly one million customers in the areas it serves. (Thermographs were not mentioned.) The response from these appeals (0.38 and 0.34 percent, respectively) was very much smaller than the response of the West Park appeal, indicating clearly that the unipurpose direct-mailer commanded greater attention. Even so, the large majority of the outreach populations were unaware of or ignored all appeals offering a free home visit and heat loss evaluation..



BACKGROUND

By early 1977, many Americans were becoming painfully aware that, as a society, we could no longer afford to consume energy at the levels to which we had been accustomed. The 1973 oil embargo, coupled with severe increases in the price of all forms of energy, caused business leaders, government officials, and the public at large to reconsider our energy-consuming way of life. The energy crisis that many experts had predicted for years seemed just around the corner.

To help solve public-sector problems, NASA, through its Applications Programs at various research centers, is working with other Federal agencies, local governments, and health organizations to identify critical problems amenable to technical solutions. For example, with the collaboration of the United States Department of Energy, NASA Lewis has been exploring ways of applying aerospace technology to terrestrial solar photovoltaic and wind energy systems. In addition to exploring alternatives to traditional fossil fuel sources, the Federal government is leading the way in making more efficient use of these traditional fuels. Heat loss from buildings was targeted as a major factor in energy consumption. It is estimated that nearly 30 percent of the fuel burned for heating escapes through inadequately insulated walls and roofs of factories, commercial facilities, government buildings, and residences.

To help focus awareness on this heat-loss problem, NASA Lewis used the remote sensing

technique of infrared thermography to record roof temperatures from an aircraft. Under the appropriate environmental conditions, and assuming the buildings to be uniformly heated, those with warm rooftops are less efficient in containing interior heat than those with cool rooftops; that is, better insulated buildings retain heat and result in less radiant and convective heat loss to the outdoors. (See inside back cover for a sample color thermograph.) In 1975 and 1976 NASA Lewis made aerial thermal scans of all of its research installations to determine the various ways large government facilities were unknowingly wasting energy and to plan corrective actions¹.

In 1977 an energy advisor to the Mayor of Cleveland learned of the work in this area and requested NASA Lewis to make similar flights over the City of Cleveland to demonstrate the seriousness and scope of the residential heat-loss problem. NASA Lewis agreed to overfly small areas of Cleveland and to record the temperatures of rooftops using aerial thermography, thus giving greater impetus to the residential energy conservation program.

Early in the project, there was close cooperation among officials of the City of Cleveland, scientists at NASA Lewis, and representatives of the East Ohio Gas Company. The Cleveland City Council recommended areas of the city in need of assistance, and the Cleveland Department of

¹Bowman, Robert L.; Jack, John R.: Application of Remote Thermal Scanning to the NASA Energy Conservation Program. NASA TM-73570, 1977.



Community Development selected three specific residential areas: the West Park community on the west side, the Fairfax community on the east side, and the Broadway-East 55th Street area on the south side. (An outreach project for the south area did not develop.) In addition to geographical and political criteria for selecting areas, it was appropriate that the overflow areas fall within those sections of the city designated by HUD as Block Grant target areas. In these designated areas the inability to pay heating bills resulted in natural-gas cutoffs and the termination of heating-oil deliveries, with extreme discomfort and sometimes tragic consequences for some residents.

Once the thermographs had been processed, NASA Lewis was asked to join with the City of

Cleveland and the East Ohio Gas Co. in presenting its results to the public in an exposition at the Cleveland City Hall. The display was met with both curiosity and interest on the part of the public in seeing thermographs of their own homes. After the exposition, the display was moved to the lobby of EOG in downtown Cleveland for additional public exposure.

Much of the appeal of the display was attributed to the colorful thermographic imagery and to the fact that energy and heat loss were very much on people's minds. People were particularly intrigued by the notion that they could see a thermograph of their own home or business. In this reaction, NASA recognized the possibility of personalizing the thermographic imagery and using it as an initial contact with a

large number of people in a campaign to disseminate heat-loss and energy conservation information throughout the community. Such a campaign could have an impact on the public's level of awareness of energy conservation issues.

At this point, NASA Lewis scientists met with officials from the Cleveland Department of Community Development and representatives of EOG to plan a demonstration of the effectiveness of this approach. NASA Lewis provided the thermographs and contracted with Epstein & Szilagyi Designers, Inc., to develop specific audio-visual aids that would be used in the dissemination process and to assist in the planning and execution of a public outreach strategy. The Department of Community Development agreed to speed processing of low-cost loans to qualified homeowners. And EOG agreed to conduct on-site home energy evaluations. These evaluations were intended to provide residents with a complete heating-energy-use assessment as well as to provide them with recommendations for the most cost efficient winterization projects they could do.

The objectives of the outreach projects were to

- (1) Educate homeowners to the mechanisms of heat loss by showing and discussing color thermographs of their individual homes
- (2) Develop a public awareness and acceptance of energy conservation as a rewarding activity
- (3) Motivate homeowners to winterize their houses, in particular, to insulate their attics adequately
- (4) Maintain records of progress in the demonstration neighborhoods to assess the overall effectiveness of the outreach effort.

NASA Lewis felt from the beginning that it ought to focus on a demonstration in the central areas of the city. These areas exhibit the greatest need, as the housing stock is old. People living in the central city have fewer resources to make improvements on their own and are consequently less inclined to do so. They are generally more resistant to societal institutions and are more suspicious of large organizations such as utilities and city governments. The central areas of our older cities are in need of an affirmative dissemination program which focuses on energy conservation. The Fairfax Community is representative of such an area that is better approached by peer groups. Other older areas of the city, with a more diverse population, may respond positively to programs initiated by local utilities and have less need for the peer approach. The West Park community is such an area.



SCOPE

An interest in public outreach to homeowners in the central city was shared by all three participants in the initial project. NASA Lewis was interested in developing strategies for reaching homeowners around issues of energy conservation. The Cleveland Department of Community Development wanted to publicize the availability of low-interest loans and grants through the HUD Block Grant Program. The East Ohio Gas Co. wanted to encourage homeowners to use its allotment of natural gas efficiently so the company could avoid cutbacks and cutoffs in service during the coming winter. In an atmosphere of optimism and cooperation, the project was launched.

It should be clear at the outset that the Fairfax outreach program was designed to be far more extensive than the West Park program. However, it was agreed that a comparison of the two ought to be made. Both approaches used thermo-

graphic color imagery and the same logic in their appeal. A major question in the comparison was whether the money, time, and sustained effort required for the community outreach approach was reflected in a significantly higher level of success. This success must be measured, ultimately, in the number of homeowners motivated to winterize their homes as a percentage of the total number of persons who came into contact with each outreach approach. The comparison was set up to investigate how each approach worked, or failed, in a central city setting. It was hoped that the results would point toward the development of a model for disseminating energy conservation information to central city residents.

On Cleveland's east side, the project focused on the Fairfax community, a seventeen-block neighborhood, comprising about 5000 residences and shops, between East 79th and East 103rd Streets and from Cedar Avenue to Quincy. The older, residential, single and two-family structures are occupied by residents in the lower half of the

economic spectrum, many of whom are elderly. Owner occupancy, however, ranges above 60 percent, signifying an underlying neighborhood stability, in marked contrast to adjacent neighborhoods. This stability is maintained by highly organized block clubs and active church groups. Central to this community organization is the Fairfax Foundation.

The Fairfax Foundation was established in 1968 to promote community strength and well-being. Of late, it has become a prime mover in the on-going process of physical renewal, by investing heavily in neighborhood property, restoring it, and offering it for sale to neighborhood residents at reasonable prices. In the process of its rehabilitation work, the Foundation hires unemployed members of the community and teaches them useful job skills. They, in turn, increase the desirability of their neighborhood housing stock and, in the process, contribute to resident pride and neighborhood vitality.

The same formula of cooperation between NASA Lewis, the city, and EOG was to be carried through the Fairfax Community project. The Environmental Improvement Project (EIP), staffed by Fairfax Foundation and CETA employees, became the focal point for activities in the community. Direct outreach efforts were carried out by the CETA workers, who contacted block clubs, church groups, schools, and other organizations.

An audio-visual presentation was prepared outlining the problem of residential heat loss, describing the techniques of insulation, explaining options available to homeowners, such as the home energy-use evaluation program and the city's 3 percent loan program, and, finally, explaining how to read and understand the thermographs. A packet of information was prepared, to be handed out at the conclusion of the audio-visual presentation. It elaborated on the presentation and contained forms to be filled out by those interested in a free home energy-use evaluation or a loan.

A display was installed at the Fairfax EIP center to introduce people to energy conservation issues and to interest them in seeing thermographs of their own homes. The thermographs of each city block were bound in an easy-to-use, loose-leaf notebook attached to the display. A sample thermograph was mass produced to introduce people to the imagery (see inside of back cover), and a number of explanatory and motivational leaflets were also developed to give the EIP staff tools to use in their outreach efforts.

The major focus of the EIP's activities was the organizing of community meetings in which the audio-visual presentation was shown and the

issues discussed. In addition, the neighborhood was canvassed by telephone and leaflets were distributed door-to-door to insure that the community was saturated with information. By these means residents were informed of the many things they could accomplish on their own. They were also referred to other institutions for more information about winterization projects and the funding (loans or grants) for such projects available to them. When the EIP project began, these institutions included the Cleveland Department of Community Development, the East Ohio Gas Co., and the Greater Cleveland Council for Economic Opportunities.

The West Park section of Cleveland's west side, from West 130th to West 150th Streets, was selected for a one-time direct-mail appeal. The portion of the community that was overflowed comprises about 5000 residences of middle to lower-middle class families as well as a sizable elderly population. Most residents in the community occupy their own homes, although a considerable number of houses are for two families. Beyond local churches, parent-teacher associations, and service groups, there is in place no community-wide organization to give the area a central focus.

A direct-mail appeal was made by EOG and distributed under the EOG letterhead to residents of the West Park area. The appeal contained a cover letter, a sample NASA Lewis thermograph and explanation, and a coupon to be filled out and returned for a free home energy-use evaluation by a gas company representative.

CHRONOLOGY

March 24, 1977	NASA Lewis overflight of three Cleveland neighborhoods.
April – May 1977	Preliminary meetings between NASA Lewis, the City of Cleveland, the EOG, and the Fairfax Foundation.
July 1977	Dissemination strategy developed.
September 1977	Audio-visual presentation completed.
October 1977	Gas company terminates its home visit energy evaluation program.
November 1977	New city administration elected. All existing programs reviewed.
December 1977	Outreach information packets completed.
February 1978	Fairfax CETA grant approved by City. EIP center prepared for public meetings.
March 1978	EIP staff begins orientation.
April 1978	Display and EIP center interior design completed.
May 1978	Block Club presidents and 40 other key community people notified about EIP. Fairfax Annual Meeting held. EIP is formally presented to the community and staff is introduced. Audio-visual presentation is shown, and information packets are distributed.
June – August 1978	29 Community winterization meetings are held.
July – August 1978	Leaflets delivered to every house in the Fairfax area (6000 leaflets are distributed to 4080 dwellings).
September – December 1978	34 community winterization meetings held and broadened in scope to Community Exchange.
January – May 1979	Weekly Community Exchange meetings continued.





The EIP Center

Of the 167 homeowners, 57, or 34 percent, live in two-family houses, 108, or 65 percent, live in single-family houses; and 2, or 1 percent, were owners of businesses making improvements to their commercial property.

While statistics are not available for the total community, the sample reflects Fairfax overall resident stability. Some 155 of these residents, or 92 percent of the total sample, have resided at their present address for 5 years or longer; 11, or 7 percent, have resided at their present address from 1 to 5 years; and one resident, or less than 1 percent, has resided in the Fairfax area less than 1 year. Based on composite data from all respondents, each home owned by an EIP client housed a mean of 3.2 persons.

It is difficult to arrive at an assessment of the quality of the housing stock in the Fairfax area. However, it is possible to generalize that the houses ranged from 75 to 100 years old. They exhibit a wide range of difference in their outward appearance and upkeep. Compared with a city-

wide average gas bill for 1977 for single-family houses of \$38.09 per month, Fairfax residents in the EIP sample were averaging \$38.42 per month. The yearly average gas bill per month for a two-family house in Fairfax was \$49.13. For the 4 months of December through March of 1977, the period of heaviest gas consumption, the Fairfax to city wide comparison is as follows:

	Fairfax	City wide
Single family	\$71.42/mo.	\$68.41/mo.
Duplex	91.06/mo.	-----

While the Fairfax average appears to be only slightly above the city wide average, it does not accurately convey the extent of suffering sustained by some people in the community. In the sample of people making application to the Council for Economic Opportunities (CEO), most had monthly gas bills of \$110 to \$130 during the coldest winter months. One woman reported



monthly gas bills of \$170 a month. When coupled with high electric bills, these figures represent a sizeable portion of most of these people's monthly income. For retired persons on fixed incomes of \$300 to \$400 a month, such energy expenses are devastating.

It is clear from the color thermographs and from an examination of residential properties in the neighborhood that a significant portion of the community's excessive gas consumption can be attributed to the low energy efficiency of the houses themselves. Since the Fairfax sample did not differ significantly from the city-wide average, it is safe to assume that housing throughout the city utilizes energy inefficiently. Thermographic evidence from the other areas substantiates this.

All 167 persons who were designated as EIP clients, and have elected to pursue some form of winterization goals:

- have seen the NASA-sponsored slide-sound presentation

- have received the packet of information which accompanied the presentation
- have seen a thermograph of their home
- have discussed various energy conservation projects with a Fairfax EIP worker on a one-to-one basis
- have received a home visit energy-use evaluation

This list forms the basis for clients' decisions about how to approach the weatherization of their property. Followup phone calls were made to reinforce these contacts and to maintain people's interest in the program. Over 260 such calls were made up to the time of this report.

Although EOG had expected to conduct all of the home visit energy evaluations, a company decision was made to phase them out early in 1978. Not long after that, EIP staff persons, trained by EOG representatives, were making home visits themselves and conducting energy-use evaluations based on the EOG checklist. To date,

196 audits have been completed. An EIP staff person inspects the home using the gas company checklist to identify problem areas; the homeowner is questioned; and the EIP worker develops a list of suggested actions the homeowner can take to make the home more energy efficient.

Of the 167 homeowners who responded to the outreach effort, 162 have applied to CEO for winterization grants of up to \$400, meant to cover the cost of insulating attics. The CEO grants come in the form of either labor and supplies or supplies alone, if the homeowners wish to install it themselves. Two homeowners have applied for 3 percent loans under the City of Cleveland Block Grant Program. Work has been completed on 22 of 167 dwellings; 18 were done by the owners themselves; 2 by the CEO crew; and 2 by private contractors. It is expected that work on the bulk of the 167 homes will be completed in the remainder of 1979.

As of this writing, 89 residents have begun, on their own, winterizing their homes. While most of these residents have also applied for grants or loans, some felt strongly enough to start without the promise of additional money. The following list is a breakdown of winterization projects being implemented in the Fairfax area:

Number of residents	Task
16	Replaced windows
12	Replaced screen doors with storm doors or put in new storm doors
8	Put in storm windows
28	Replaced furnace filter
8	Had furnace inspected and air ducts repaired
7	Covered doors and windows with insulating plastic
2	Had openings in foundation tuck-pointed
28	Had gas line checked
6	Partially insulated their attic

It is a tribute to EIP outreach that many people saw the wisdom of doing something about their homes, before the benefits would be easily seen. It is difficult for people without resources to consider taking such actions, the direct fiscal benefits of which can only be realized much later. It is also interesting to note that 28 people in Fairfax had received EOG home energy-use evaluations in 1977, one year before the EIP began its efforts.

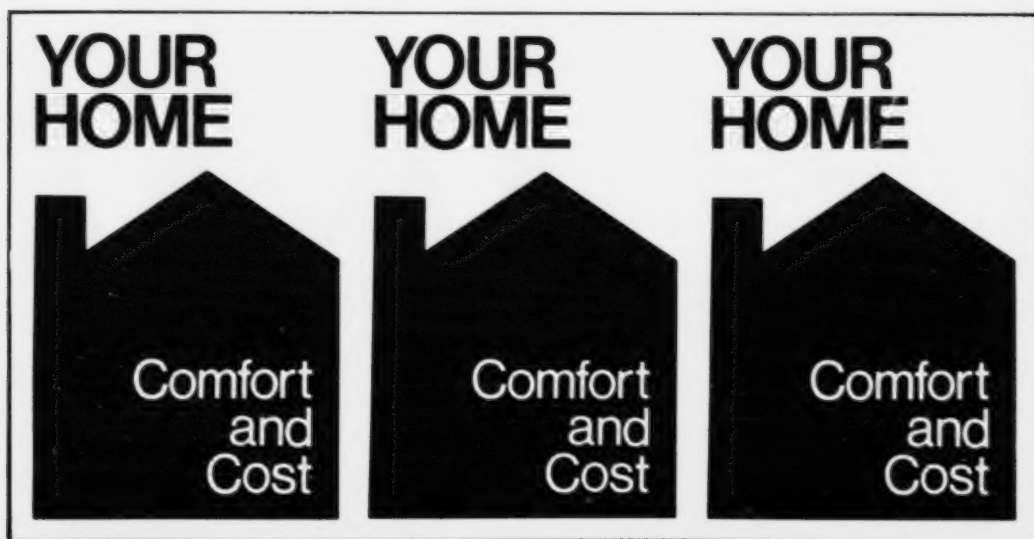


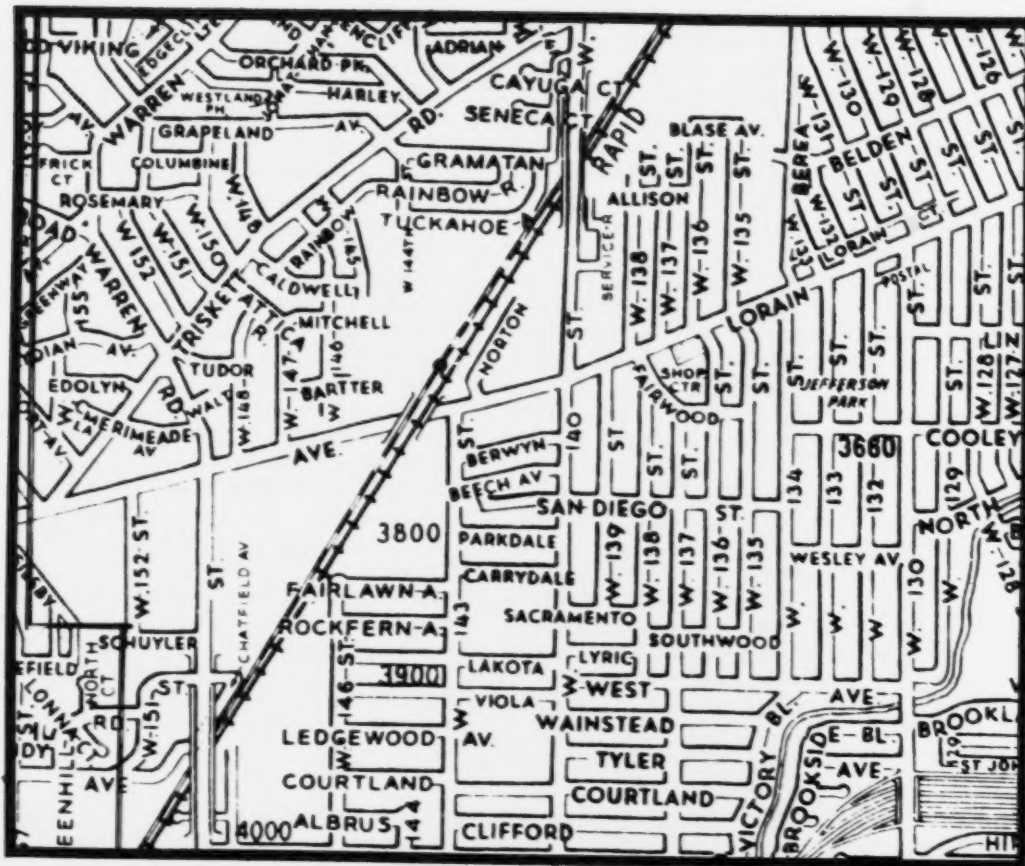
An informal tally was taken, by the EIP staff, of people's initial reaction to the outreach program. Two general responses seem to prevail. The first category was overwhelmingly positive. People who expressed initial approval of the EIP concept were generally those people most closely tied to other Fairfax programs or those in leadership positions within their block club or other community organization. These people quickly realized the advantages of participation in the winterization program, both for themselves and for the community as a whole. Their ties to the Fairfax Foundation strengthened their commitment to the overall goals of the program. The second category of responses to the program could best be described as skeptical. Most were eager to reduce their gas bills. However, they were skeptical about the ability of the program to find ways to help them pay for winterization. Some also doubted whether any form of energy saving action would be effective in the face of steadily rising costs. Others disbelieved the interest of the city or of EOG in their problem.

Despite their skepticism, many residents did proceed with winterization projects. There seems to have been little difference in motivation between those who were initially positive and those who were initially skeptical. Most of the people, regardless of attitude, continued to be involved, and, in fact, began winterization projects, either by applying to CEO for funds or by doing it themselves.

While time will be the final judge, at present it seems that the outreach strategy is successful in

the Fairfax area. The community's response to the program has been enthusiastic, and the 23 percent of the total number of Fairfax homeowners who have responded has been gratifying. It is difficult to compare this group of responsive people with the community as a whole, as a community profile is only partially complete at this time. However, it is clear that the people responding are those most connected to community organizations. They tend to be somewhat older than the mean, with longer than average lengths of residence. They were easiest to reach, the most stable, and the people with the largest emotional and financial stake in the community. It might have been predicted that this type of homeowner would step forward first to protect his or her investment in property and community. Whether the total program is ultimately successful in motivating a broader base of residents will be determined by the ability of these leaders and of the program to reach people less tied into the community, to reach younger homeowners, and to reach those who are more recent residents. Up to this point, it seems that, by maintaining an energy conservation center and by followup, the Fairfax EIP has reached a significant fraction of the community population.





West Park Project

The direct-mail approach was employed in the West Park area—a community that seemed to lack a coherent neighborhood organization. The East Ohio Gas Co. agreed to be the sponsor of the mailing as part of the cooperative energy-conservation project. The mailing to 4000 homes included a sample thermograph, with explanation, and an offer of a free home energy-use evaluation by the gas company along with a chance to see a thermograph of the recipient's own home. It was strikingly packaged in a 9- by 12-inch envelope, designed to be highly visible in the mail. A total of 130 requests for home visits were received by EOG. These home visits were promptly completed by EOG representatives.

Because the 4000 pieces were mailed third class, the Post Office could not guarantee that they were all promptly delivered. A spot check about 6 weeks after the mailing indicated that some had not been received. However, if the full

mailing of 4000 is assumed, 3.1 percent responded to the mailer and requested home energy-use evaluations by the EOG.

Followup telephone interviews with the respondents were made 1 year later. A copy of the questionnaire used is presented below:

_____ Name _____

I am calling for the NASA Lewis Research Center. Do you remember about a year ago returning a coupon to the East Ohio Gas Co. accepting the offer to see a color thermograph of your house?

Did you meet with the East Ohio Gas energy man? _____

Did you see a color thermograph of your house? _____

How many people live in the house? _____

What is your average monthly gas bill? _____

Do you have attic insulation? _____ How many inches? _____

What are your plans for next winter? _____

The results of the telephone survey indicated that the West Park respondents fell into three approximately equal groups:

Thirty-five percent had winterized their homes before the EOG home energy-use evaluation, but they had wanted to know if more could be done and they had wanted to find out how they compared with their neighbors.

Thirty-five percent had homes with little insulation, but, although curious, they were complacent and planned no further improvements.

Thirty percent had uninsulated older homes and were increasingly aware of the need to winterize their homes. They had continually postponed action, but were making specific plans to insulate.

All of the West Park homeowners visited recalled having the thermographs of their home interpreted for them.

The 3.1 percent response to the West Park mailer campaign may be a significant measure of the personalized appeal of the thermography when compared with EOG newspaper advertisement offering the home energy evaluations to their almost one million customers. The response

from these newspaper ads was considerably smaller than the response of the West Park direct-mail approach.

A single ad was placed in each of six major newspapers on April 19, 1977. By April 29, 1977, the ads resulted in the following coupon returns:

Cleveland Metropolitan Area: 1973 coupons received from an estimated 500,000 customers, for 0.39 percent response

Akron-Canton-Youngstown Area: 376 coupons received from an estimated 100,000 customers, for 0.38 percent response

By March 10, 1978, the total coupon return resulting from the six advertisements was

Total Service Area: 3822 coupons received from an estimated 1,000,000 customers, for a 0.38 percent response

Coupons were inserted with one monthly gas billing and resulted in

Akron-Canton-Youngstown Area: 337 coupons received from an estimated 100,000 customers, for a 0.34 percent response

The most remarkable development in the EOG

THE EAST OHIO GAS COMPANY

HERE'S HOW YOU
CAN SEE A COLOR
THERMOGRAPH
OF YOUR HOME
MADE BY A NASA
AIRCRAFT
LAST WINTER

AND
MAKE YOUR HOME
COMFORTABLE
AND MORE
ECONOMICAL
TO OPERATE

West Park Resident
Cleveland, Ohio 44111

home visit program was the number of telephone calls received by the company requesting energy-use evaluations. As of March 1978 when EOG terminated the program, 4367 telephone requests had been received. Apparently, the evaluations were so productive and so useful to customers that they told friends and neighbors to take advantage of the gas company's offer. In all, the gas company made over 9000 home visits as follows:

Newspaper coupons	3822
Telephone requests	4367
Miscellaneous	333
West Park Mailer	130

It should be noted that the requested home evaluations resulting from advertisements, billing inserts, and telephone calls did not include thermographs of the requestor's home or area. These results suggest that an offer of a home energy-use evaluation by a direct-mail approach and using the thermography, although more costly per customer, is significantly more effective than newspaper advertisements and billing inserts. It remains, however, that the majority of the outreach populations were unaware of or chose to ignore all appeals offering a free home visit and heat loss evaluation.

The West Park followup interviews suggest that the home energy-use evaluations had the greatest effect on and were of the most use to those owners of older homes who, up to that time, had taken no conservation measures but who now expect to do so.



EVALUATION

Importance of Thermography

Much useful information has been obtained about the effectiveness of the program elements that NASA Lewis was instrumental in producing. The effectiveness of the EIP Center was greatly enhanced by the colorful thermographic display. The EIP staff reports that the display attracted much attention and induced many people to ask questions and to find out more about energy conservation in homes. NASA's hypothesis, that people would be intrigued by the opportunity to view thermographs of their own property, proved to be correct. Both the audio-visual presentation and the display encouraged many people to want to see the thermograph of their home. This gave the EIP staff an effective tool around which to build an energy conservation appeal.

Once curiosity was aroused by seeing their own thermograph, and often those of their friends and neighbors, residents were committed to an

educative process, the end result of which was a desire to improve their property.

The audio-visual presentation was designed to be the central tool used by the staff. It was shown throughout the community as well as to persons walking into the EIP Center. It served as a good beginning for discussion, in that enough information was presented to guide people to ask the correct questions. It reinforced the personalized nature of the outreach effort and helped to convince the community of the seriousness of the energy problem it confronts.

The color thermography itself was very attractive to the residents and seemed to have a drawing power all its own. Much time went into explaining how the thermography was done and how to interpret the images. However, the staff had trouble in the interpretive tasks because of the lack of color standardization among the different sets of imagery they were given to work with. The colors of the master Fairfax map did not correspond closely enough to the colors of the individual section thermographs that the master was intended to index. The staff felt that

this lack of a color standard complicated the task of communicating what is essentially a difficult concept to comprehend: the use of colors to express rooftop temperature differences in an image taken from an aircraft.

However, people responded well, once thermographs were adequately explained. While most were interested in seeing their own thermograph, the staff reports that people were equally interested in seeing the thermographs of their neighbors' and friends' homes as well as those of community buildings they frequent. As was hoped, the task of deciphering the thermographs proved to be a successful mechanism for committing people to a concern for energy conservation. Involvement in the process of finding their own home on the thermographs produced a beginning understanding of what the thermograph represented. This knowledge was then the basis for people taking the next logical step of seeking more information. With this, the seeds of eventual action were sown. The testimony to this is the large number of people who proceeded from the point of not knowing very much about home energy conservation to the positive action of requesting aid for winterizing their residences.

Roadblocks to Effective Conservation

While much interest has been generated by the program, very little winterization work has been accomplished in the Fairfax community. Some of the program's shortcomings have been alluded to earlier. Yet the major reasons for the lack of winterization work lie outside the control or influence of the EIP project. The first component of the problem lies in the fact that Fairfax is a community of modest incomes and limited resources. Most of the work will have to be accomplished with outside funds, either grants or low-interest loans. The number of grants available is limited, and the amount of each grant will be limited as well. Consequently, although the program has produced a number of people willing to take action, many cannot afford to, even though they realize the long-term benefits that would accrue to them if they took such action. Those people who have applied for low-interest loans or CEO grants have been waiting for 9 months for their applications to be processed. This delay dampens high interest, and some people have become disillusioned.



Additional stumbling blocks to the EIP winterization effort were the termination of the home visit energy-use evaluation program by East Ohio Gas and the change in the administration of the City of Cleveland in 1977. During the planning of the project, both were committed to full and active participation as resource providers, educators, or sources of funding. The loss of the gas company's program eliminated, for a time, the followup contacts with Fairfax residents. Although the EIP took over this task, the additional work load pressed the already busy staff. The challenge was met, however, and at this writing nearly 200 home energy-use evaluations have been made by EIP staff members. The loss of the city's participation was equally detrimental to the project's progress. The previous administration had committed itself to streamlining

its application process for the 3-percent loans, so that residents could receive their loans quickly. With the change in city administration came a review of commitments and an altered responsiveness to the particular needs of the Fairfax community. The loss of city support forced the EIP staff to seek other sources of funding. The EIP has obtained the cooperation of the Council for Economic Opportunities (CEO) and its winterization grant program. Currently, CEO is processing 167 applicants.

On a very slim operating budget, and with minimum training, the EIP project staff successfully overcame the difficulties created by the withdrawal of the City of Cleveland and the EOG. In doing so, the EIP project was diverted from the planned program and the required time for completing the total outreach effort was increased.



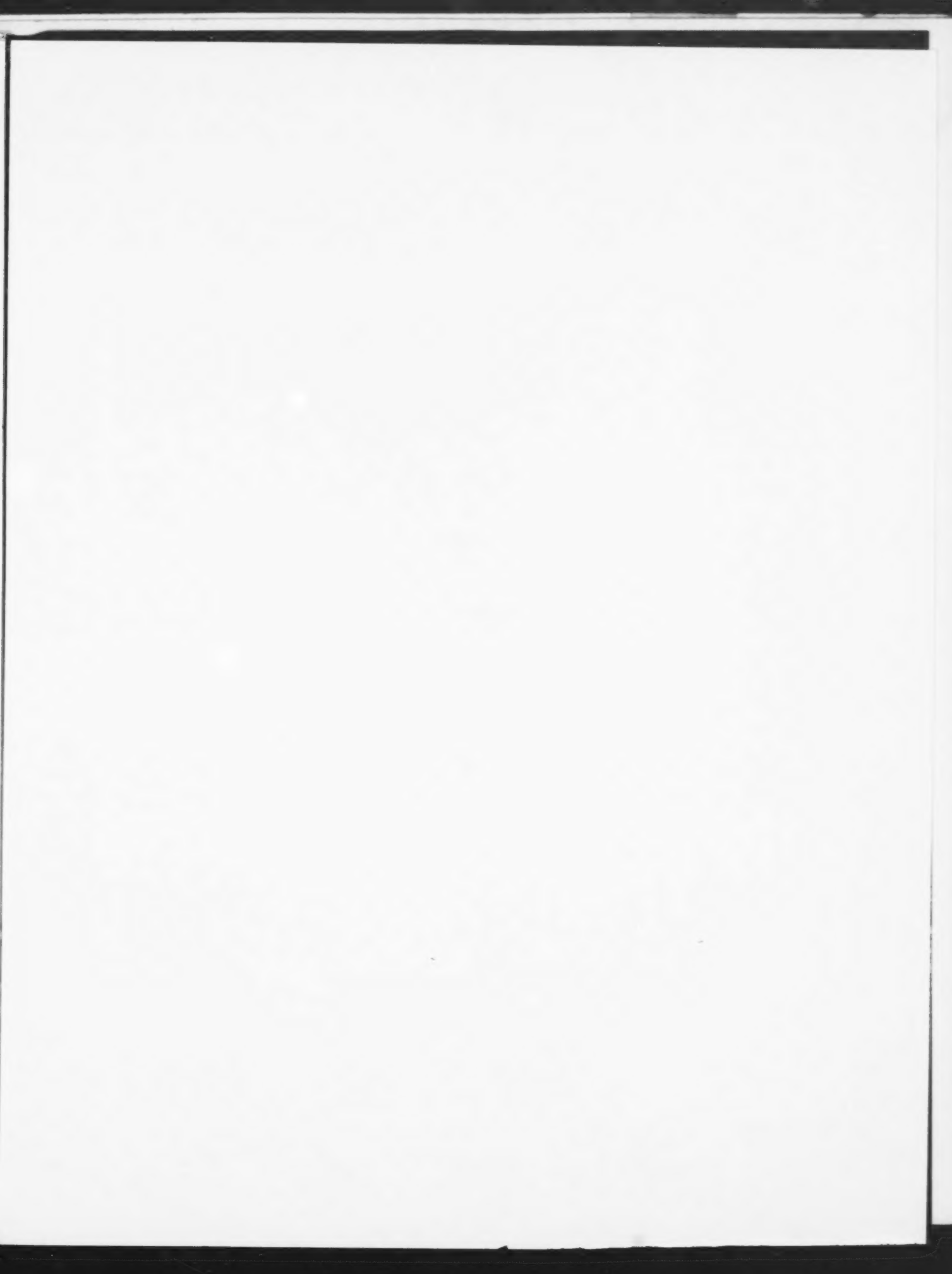
EXPECTATIONS

Other programs initiated by the EIP staff are now in full swing and will increase the effectiveness of the outreach effort. Two staff persons have been working on a census of the community to determine the causes of the population change that has occurred since the last government census (1970). During interviews with individual householders, they are spreading the word about the winterization program. A survey is also being conducted to document land use and the condition of all structures in the Fairfax area. The census and the survey will comprise the Fairfax Community Inventory, which will provide the Fairfax Foundation with the information it requires to serve the community most effectively in its many programs. The Community Inventory will also be useful to EIP in the processing of grant applications and other funding studies.

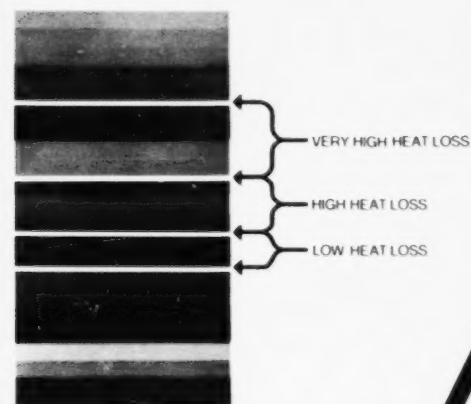
The Community Exchange grew out of block meetings where it became evident that residents needed to know about other public service programs. The popularity of the Community Exchange and the numerous requests for help with other environmental problems has led the EIP to increase its emphasis on its role as the liason between residents and other agencies responsible for public service programs. The popularity of the Community Exchange demonstrates that an important need is being served by the existence of the overall EIP. What was planned as an outreach effort around issues of residential heat loss has blossomed into a multifaceted community improvement program.

The commitment and vision of the Fairfax EIP staff, plagued with support and organizational difficulties, is largely responsible for this ambitious broadening in emphasis. When added together, the programs of the EIP Center form a strong foundation for the building of a powerful community organization dedicated to representing the interests and meeting the needs of the Fairfax Community.

If funding difficulties can be overcome, it is reasonable to assume that the energy and enthusiasm generated to date will propel the EIP project toward greater successes during its second year of outreach activities. In a national atmosphere of program cutbacks and budget trimming, the Fairfax experience can serve as a useful model of self-help and positive community organization. It has demonstrated that city people do care about issues of self-interest such as residential heat loss and that even more would take action if funds were made available to them. Most of all, the project has proven that a planned energy outreach effort can be effective in reaching central city populations and that, if also geared to the solution of real community problems, it can lay the groundwork for a more comprehensive program. In the year ahead, it seems likely that the EIP center, in conjunction with other components of the Fairfax Foundation's neighborhood stability program, will have a significant impact on the condition of residential properties in Fairfax and on the community's general quality of life.



NASA
Color Thermographs
show how much heat
homeowners
are losing



Commercial Building

Garages

Homes with
high heat loss

Homes with very
high heat loss

Parked cars



Thermal infra red data of HUD target areas
obtained over Cleveland, Ohio on evening of March 24, 1977.
10 P.M. weather clear, calm, w/air temperature 25°F

National Aeronautics and Space Administration